# A Study of Forecasting Practices in Supply Chain Management

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***Abstract*— This study demonstrates forecasting practices in supply chain management (SCM) at various areas, particularly Life science, Retail Chain, and FMCG. The authors depicts the scenario of forecasting practices based on secondary data and represents SCM role, demand management, collaborative coordination, etc. In addition , the study reveals the limitation and few practical solutions on forecasting to be useful in the business organization. Consequently the authors describe recommendation and proposes a model on forecasting management model. Though this paper highlights in intensive analysis, however, it unlocks further frontiers for the prospective researchers as well as practitioners in order to apply forecasting techniques.**

***Keywords*—** *Forecasting, Supply Chain Management, Life Science, Retail, FMCG, Value adding (VA) and Non Value Adding (NVA)*

## 1. Introduction

Modern companies need to deal with different issues in challenging environment. The successful companies are more adaptive and promptly follow the updated or revised concepts of business management. Gradually they apply these techniques into functions. Supply Chain Management (SCM) is one of the new concepts in the corporate sector of Bangladesh which was practiced from late 90s. Initially the Multinational Companies (MNC) incorporated Supply Chain Management in their structures and later on other privates and local conglomerates embraced the concepts. Since beginning purchase and materials management were the main functions of SCM, but later on SCM took the integrated shape i.e. consists of sourcing, materials management, manufacturing support, and distribution management.

Considering the competitive market scenario, SCM becomes the prime functioning area among the companies. SCM deals with direct, indirect, and services from the origin (as input materials) to end customers as final products.

A Supply Chain is a network among the supply chain partners such as suppliers, manufacturers, distributors, retailers, transporters etc. who shares information, deliver goods, ensure services and perform other intermediate activities to meet customer demand [1].

Forecasting is far most beginning activities of SCM which initiates the all other actions of SCM. However forecasting plays an important domain in inside as well as outside of the company [2]. Forecasting is the key driving factor in planning and making decisions in SCM as well as enterprise level. Companies are, truly perform professional way, highly depends on true numerical value of forecasting to take major decisions such as capacity building, resource allocation, expansion and forward or backward integration etc. The exploratory study focus the following objectives:

- Extensive literature reviews on forecasting, demand management based on secondary data.
- Understanding the practice, management and application of forecasting in the three industrial growing sectors of Bangladesh such as lifesaving industry, Retails Chain, and FMCG.
- Limitation and solution of demand forecasting
- Proposea forecasing management model in Supply Chain Management.

In the next section a study on literature review has been described. The management of forecasting in organization level along with a proposed forecasting management model is discussed in section 4 and conclusion remarks are mentioned in section 5.

## 2. Literature Review

The Global Supply Chain Forum identified demand management as one of the eight key business processes that consists the Supply Chain Management function in a firm [3]. A forecasting is the fundamental step of demand management that optimize the customer satisfaction through capabilities of Supply Chain. Researchers focused on the most of the aspects of SCM, after then forecasting is still need to be addressed in research field of Supply Chain [4].

Forecasting is a prediction or an estimation of an actual value in a future time period or for another situation. Forecasting is the form of statement that reveals future value of interest for a specific time period that is used as prime output in decision process of SCM [5]. Forecasting has impact on fulfillment of the customer requirements, reducing risk and in measurement of Supply Chain process improvement [6]. The role of forecasting in rational decision making process for future event has been attracts attention of Researchers. It is suggested to do more research in foretasting considering its importance in few decision making process [7].

In order to obtain effective output, and to optimize the resources, forecasting must be shared among partners, suppliers, 3PL suppliers, financial institutions and within SC department also. One of the main reasons of bullwhip effect is uncoordinated forecasting. Thus bullwhip effect management strategy must focus on sharing demand and forecasting information [8].

Forecasting can be applied both in individual and business area as part of planning tool. SCM, inventory control, budgeting in Government, and personal investment are the main application area of forecasting. Recently forecasting becomes the growing concern in other untapped areas. Forecasting efforts are identified as input as dual model of disaster relief in Humanitarian Logistics and Supply Chain [9] and forecasting is identified as Supply Chain Management process which is acknowledged as skill for using in development of local capacity in the affected communities [10].

Tourist is considered as consumer which forecast can be analyzed by consumer and demand aspects [11]. Supply Chain Management strategy has been integrated through model develop0ment by researchers with Environment Management, Integrated Tertiary Educational, Service Management, Hospital Management [12], [13], [14], [15]. In future, forecasting will get priority in research area in these emerging areas.

It is usual that there might be forecast error as actual results differ from the projected value, long time horizon has chance of more error. This is important to measure the forecast error for adapting corrective action plan [16]. The development of electronic communication technology enables the Supply Chain Management partners to share real time data and information across the network which helps dual benefit to inventory and customer service [17]. This underlying result of the process is accuracy of forecast which firmly ensures the successful and sustainable business operations [18]. This term called Collaborative Planning, Forecast, and Replenishment (CPFR)

After then, CPFR has some challenging issues to be effective which are identified by many researchers. These are lack of trust, lack of internal & external forecast collaboration, availability & cost of technology, fear of collusion, lack of training and skills, and fragmented information sharing [19].

Sales and Operations Planning (S&OP) is an integration process used in business organization to ensure efficient coordination among the different functions for aligning company strategy with Supply Chain planning. Globalization, new opportunities and Supply Chain Management differentiation compel the organization even struggle further as the integration process among suppliers, market, and stakeholders become complex [20].

MRPII is the foundation part from where S&OP has been developed, evolved and takes the shape of present status since 1970 [36]. S&OP is a process to make balance and integration between demand and supply which occurs once in a month with a horizon of 12-18 months. [37]. Traditional S&OP process focus on the supply and demand management whereas, the advance S&OP process covers data gathering, demand planning, supply planning, premeeting, and executive meeting [37][38]. This process starts with the gathering data for demand and supply planning, A draft demand plan is prepared considering current SKUs and new products for delivery. The plan needs to be adjusted with capacity requirement planning. Finally, in a formal meeting in presence of all concerned department the draft plan has been finalized for execution.

Like forecasting on direct materials, research paper on spare parts have been done with due importance. It is difficult to make forecasting for spare parts in

any organization. Product categorization is the one of the deciding factor for forecasting of spare parts. Product are classified on three criteria: lead time, price, and consumption level [33]. Considering the demand pattern product are also classified into five categories. These are smooth, erratic, low turnover, slightly sporadic, and strongly sporadic [34].

Forecast, demand management and inventory of concern as customer satisfaction are associated with products and services. Neural hybrid approach for lumpy demand [21], and different forecasting methods for intermittent product [22] have been developed so far to estimate the forecast of spare parts.

CPRF will force suppliers to innovate, build on strong one-to-one relationships that will drive smarter ways of doing things [18].

## 3. Methodology

The research represents based on the secondary data, includes interview with experts from the sectors of life saving , FMCG, and Retail chain,online database, books, journals, conference papers etc. Widespread research papers and conference papers have ben appraised from International Journals such as PROQUEST, EMERALD, EBSCO, IEEE, ACM, JSTOR etc.

## 4. Discussion

In Bangladesh, among the all growing sectors FMCG, life savings, and retail chain are the fastest growing sectors, As per data of ESPICOM ( a BMI Research) the total life saving market size is USD 8 bn in 2014 with 12% growth rate p.a.

Bangladesh has a mix of supermarket set ups of which some are full fledged super market and others are smaller in size called convenient shop or mini super shop. The large supermarkets have centralized procurement systems, centralized warehouse, own delivery fleet, contract growing etc and prefer supplier agreements to reduce supply uncertainty. As per Gain Report # BG 3014 date 07.03.2013, Foreign Agricultural Service, USDA the market size of retail chain in Bangladesh is USD 192 mio with 15% growth p.a. In 2012. There are 200 large and small retail chain shops in Bangladesh which are located across the country and full fledged retail chain shops keeps 8000-10000 SKUs [23].

In the last few years, FMCG sector of Bangladesh has experienced a dramatic growth both qualitative and quantitative improvements, have occurred in the consumer durable items [24]

### 4.1 SCM Role

Most of the companies of these sectors are more or less experienced with Supply Chain function with the aim to achieving competitive advantages in dynamic and intensified competition market. In this competition scenario, Supply Chain has been proven day by day as one of the managerial techniques to maintain profit and growth [25]. The SCM is still in evolutionary process in Bangladesh

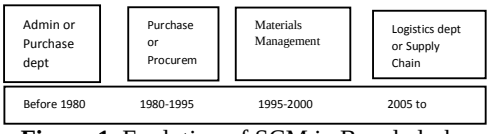


**Figure 1.** Evolution of SCM in Bangladesh

It is taking the integrated shape with trial and error way or as per company's priority area. The practice and application of SCM in these sector is behind compare to the evolutionary time line of SCM [26].

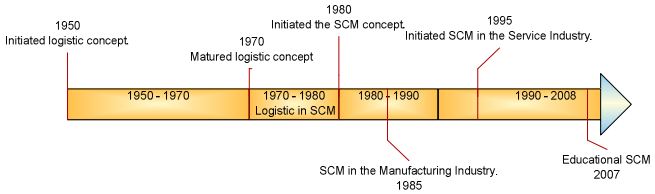


**Figure 2.** Evolutionary Time line of SCM [13].

### 4.2 Forecasting Management

Forecasting plays an important role in business process of a company. This is considered as far most beginning input in SCM dept and within the organization. Forecasting as part of SCM functions attracts the attention of the companies gradually which time line evolution is close to that of SCM evolution in Bangladesh.

Within the organization, Marketing dept. submits the forecast in rolling fashion that may be aggregate form, SKU basis, and in SKU basis with place and date of delivery. Usually forecast is submitted at end or at beginning of the month with a consideration of freezing month.

Materials Management (MM) team is the custodian of the forecast in SCM. The role of MM is processing, verifying, and managing the product forecast to expedite the raw materials and finished goods production and inventory planning in the organization. Ref [32] defines MM as a concept concern with the management of materials until the materials have been used and converted into the final product activities include cooperation with designers, purchasing, receiving,k storage, quality control, inventory control and materials control.

After receiving the forecast MM managers verify the forecasting value with historical data and revise it after considering the purchase delay, late shipment, production limitation etc. MM manager share the revised forecast with user departments (Production, Marketing, Finance, SCM) for comment. The final forecasting then converted to requirements of input materials through ERP or similar type software for sharing. MM team sometimes receives new product forecast and urgent forecast to meet any special requirements.

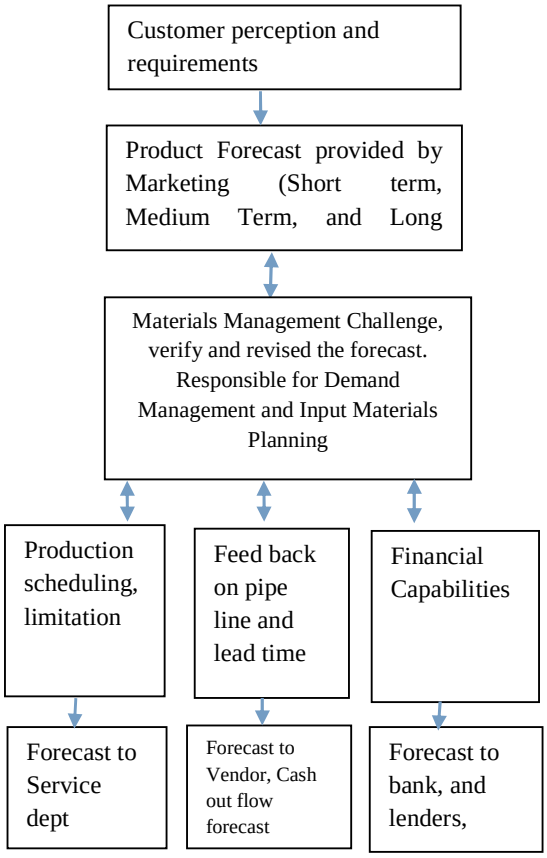


**Figure 3.** General flow of forecast

### 4.3 Demand Management

Once the forecasting figure is agreed and finalized, it becomes demand for all users. MM manager is the anchor point for demand management. In these sectors managers coordinate, share the information regarding the all activities as mentioned in the general forecast flow. Even in case of any deviation, the managers makes an alternative plan for ensuring maximum customer satisfaction. The managers continuously follow up all activities of implementation of forecasting in the organization. In some organization there is weekly formal follow up system regarding the materials management job.

### 4.4 Forecasting Management Challenge

The provided forecasting value and the management of forecast has some loop holes due to behavioral attitudes of users. As the forecast values differ from actual value in most of the times, the forecasting provider shows always conservative attitudes in forecasting figure as well as in behavior process. Thus this creates the lack of trust among the users. There is tendency to provide the revised forecast during the freezing period which makes the MM job difficult and value less.

The marketing department initiates the forecast at beginning of the process, sometimes has lacking of skill on forecasting. Thus it is observed that the forecasting value of launch items are very irrational which ultimately incur inventory.

All user try to manage the logical facts to protect the forecast when it differs from actual figure. Thus a blame fixing game is exist there. As a result, there is minimum lack of internal and external forecast collaboration.

### 4.5 Coordination meeting on forecast

Every companies hold monthly meeting on forecasting, product supply, production status, inventory value etc. This meeting normally chaired by the business head whose department initiated the forecast. The meeting generally is called on beginning of the month and in few companies at end of the month. All user departments must report in the meeting about the progress of implementation of forecast related activities. One of the limitation of the meeting is analysis of the actions that already has taken place i.e. post mortem attitudes.

Coordination in supply chain and interact with external partners is essential in the current rapid growing globalization and concentration on core competencies. Except physical meeting, virtual meeting, coordination through demand planning IT tool could be alternative [31].

### 4.6 Forecasting Method

Though there are generally mainly two types of forecasting methods such as qualitative and quantitative, only qualitative method is followed in these sectors. The managers tried to use only judgmental forecasting approach in most of the product launching cases as a result substantial gap between forecasting and actual sales is occurred [29] . Marketing and sales department are more involved in new product launching process rather than new product forecasting process as accuracy of forecasting depends on the market and customer base [29]. Therefore there is also scope for SCM to add value in new product launching process - New Product Development (NPP) to New Product Performance (NPP) by ensuring active involvement of suppliers (for expertise, product features) [30], optimizing new product inventory and performing other value adding activities.

### 4.7 Spare Parts Forecasting

Normally the maintenance or production department control the inventory of spare parts. Thus they prepare requisition for spare parts. Though recently limited number of forecasting method on spare parts have been developed, there is no use of these techniques in spare parts forecasting. The issue of spare parts hardly discussed in monthly coordination meeting.

Products' character classification and demand pattern are the deciding factors for forecasting of spare parts. The life cycle of spare parts is a deciding factors as final product life cycle is related to it [35]. Most spare parts shows the intermittent demand that is happened at any moment and then remain long time without any demand. It is difficult to predict the intermittent demand. Researchers developed few models based on the industry, duration, mathematical and statistical method.

The authors suggest the following model to overcome the limitation of forecasting practice in different sectors.

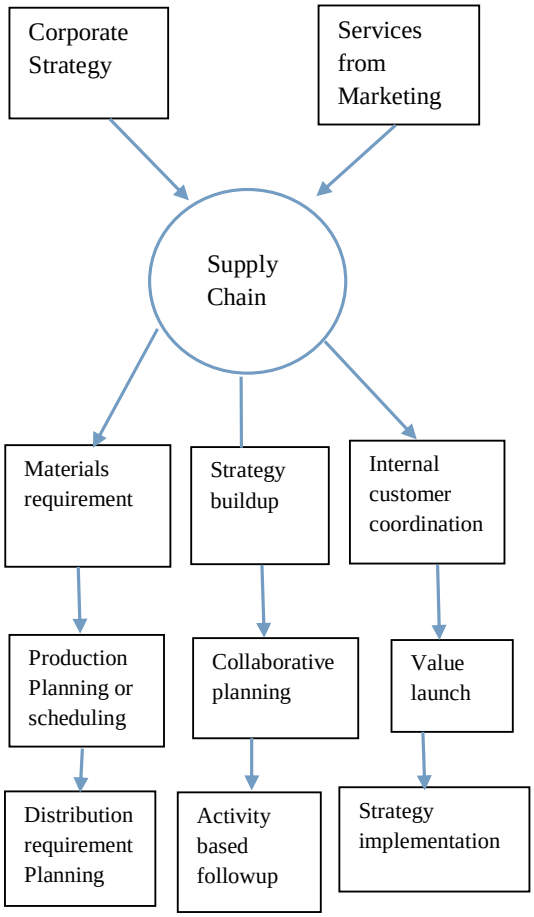


**Figure 4.** Proposed forecasting management model

Supply Chain Management will be the coordinating point for making alignment corporate strategy with SCM strategy and responsible for implementing the strategy within and out side the organization. In the proposed model, the actions are designed as service requirement rather than piece meal basis. Marketing department, for example, will ask for services which is not limited to implementation of forecast but other value adding (VA) job for supply chain such as coordination of product launching (sourcing to delivery to warehouse), Strategic stock build up etc.

This model proposes the activity based follow up i.e. there will be follow up from SCM in every steps of any activity. Quality Control for example, held up the QC pass due to shortage of supportive documents. As SCM keeps track on each and every activity of the process, they can identify where the process getting slow and take immediate measures .

In an organization, each and every department does a good number of non value adding jobs which create bleeding wound in the organization. Structuring the organization and departments based on management principle such as value adding manager - subordinates relationship, knowledge sharing [27] ensures the trust, and productive workplace [28] Internal customer coordination and value launch will help to eliminate non value added jobs.

## 5. Conclusion

The practice of forecasting in the mentioned three sectors is limited though there are enormous opportunities to use this managerial technique along with the SCM strategy. Competitive situation always ask for change rapidly and this would be the continuous process for sustainable growth.

Forecasting could be used in other than direct materials requirement such as spare parts, office stationary etc which are untapped area in the organization. Organization can be more effective by eliminating non value added activities from the concerned department.

Finally, as study is based on secondary data which represents the limitation of this paper. However, the authors shed a light on forecasting for corporate executives, and academic scholars in order to accomplish further investigation.

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